

What is claimed is;

SUB A 1. A color filter comprising a transparent substrate, a picture element part provided on the transparent substrate by a pattern of a plurality of colors with an ink jet system, and a wettability-variable layer, in which a wettability can be changed, provided for forming the picture element part.

2. The color filter according to claim 1, wherein the wettability-variable layer is provided on the transparent substrate, and the picture element part is provided on the wettability-variable layer.

3. The color filter according to claim 2, wherein a space between the picture element parts is not more than  $2\mu\text{m}$ .

4. The color filter according to claim 2, wherein an ink-repellent convex part is formed on the wettability-variable layer at a boundary portion of the picture element part.

SUB A 2 5. The color filter according to claim 1, wherein the picture element part is provided on the transparent substrate, and the wettability-variable layer is provided on a border portion between the picture element parts.

6. The color filter according to claim 5, wherein a wettability on the transparent substrate is less than 10 degrees in terms of the contact angle with a liquid having the surface tension of  $40\text{ mN/m}$ .

7. The color filter according to claim 1, wherein the wettability-variable layer is a photocatalyst-containing layer comprising at least a photocatalyst and a binder and having the wettability which is changed so that a contact angle

with a liquid is reduced ~~by~~<sup>by an</sup> energy irradiation.

SUB A3 8. The color filter according to claim 7, wherein the photocatalyst-containing layer contains fluorine and the photocatalyst-containing layer is formed so that the fluorine content in a surface of the photocatalyst-containing layer is reduced by an action of the photocatalyst upon irradiating the photocatalyst-containing layer with the energy as compared with before the energy irradiation.

9. The color filter according to claim 8, wherein the fluorine content in a part in which the fluorine content is reduced by irradiating the photocatalyst-containing layer with the energy is 10 or less relative to 100 of the fluorine content of a part not irradiated with the energy.

SUB A4 10. The color filter according to claim 7, wherein the photocatalyst is one or more substances selected from the group consisting of titanium oxide ( $\text{TiO}_2$ ), zinc oxide ( $\text{ZnO}$ ), tin oxide ( $\text{SnO}_2$ ), strontium titanate ( $\text{SrTiO}_3$ ), tungsten oxide ( $\text{WO}_3$ ), bismuth oxide ( $\text{Bi}_2\text{O}_3$ ) and iron oxide ( $\text{Fe}_2\text{O}_3$ ).

11. The color filter according to claim 10, wherein the photocatalyst is titanium oxide ( $\text{TiO}_2$ ).

12. The color filter according to claim 11, comprising the photocatalyst-containing layer in which fluorine element is contained in a surface of the photocatalyst-containing layer at rate of 500 or more relative to 100 of Ti element as determined by a X-ray photoelectron spectroscopy.

SUB A5 13. The color filter according to claim 7, wherein the binder is organopolysiloxane having a fluoroalkyl group.

14. The color filter according to claim 7, wherein the binder is organopolysiloxane which is a hydrolyzed and condensed compound or co-hydrolyzed and condensed compound of one or more of silicon compounds represented by  $Y_nSiX_{(4-n)}$  wherein Y represents alkyl group, fluoroalkyl group, vinyl group, amino group, phenyl group or epoxy group, X represents alkoxyl group or halogen, and n is an integer of 0 to 3.

15. The color filter according to claim 14, wherein a silicon compound having a fluoroalkyl group among the silicon compounds constituting the organopolysiloxane is contained at an amount of 0.01 mol% or more.

<sup>sup</sup> 16. The color filter according to claim 7, wherein a contact angle with a liquid having the surface tension of 40 mN/m on the photocatalyst-containing layer is not less than 10 degrees at a part not irradiated with the energy and less than 10 degrees at a part irradiated with the energy.

17. The color filter according to claim 7, wherein the picture element part colored with an ink jet system is a picture element part colored with an ink jet system using a UV-curing ink.

18. A process for producing a color filter, which comprises:

(1) a step of providing a photocatalyst-containing layer having the wettability of the energy-irradiated part which changes in a direction of reduction of the contact angle with a liquid, on a transparent substrate;

(2) a step of forming an exposed part for a picture element

part by pattern-irradiating with the energy on a picture element part forming portion on which the picture element part, on the photocatalyst-containing layer formed on the transparent substrate, is to be formed; and ~~X~~

(3) a step of coloring the exposed part for a picture element part with an ink jet system, to form a picture element part.

19. The process for producing a color filter according to claim 18, wherein the step of forming an exposed part for a picture element part, then coloring the part with the ink jet system to form the picture element part, comprises steps:

(a) a step of forming an exposed part for a first picture element part by pattern-irradiating with the energy on a part of the picture element part forming portion on which the picture element part, on the photocatalyst-containing layer, is to be formed;

(b) a step of forming the first picture element part by coloring the exposed part for a first picture element part with the ink jet system;

(c) a step of forming a exposed part for a second picture element part by irradiating with the energy on a remaining part of the picture element part forming portion on which the picture element part, on the photocatalyst-containing layer, is to be formed; and

(d) a step of forming the second picture element part by coloring the exposed part for a second picture element part with the ink jet system.

20. The process for producing a color filter according to claim 18, wherein an exposed part for an ink-repellent convex part on which an ink-repellent convex part is to be formed, is formed before formation of the exposed part for a picture element part, then the ink-repellent convex part is formed on the exposed part for an ink-repellent convex part through using resin composition.

21. The process for producing a color filter according to claim 20, wherein the ink-repellent convex part is formed between the picture element parts.

22. A process for producing a color filter, which comprises:

(1) a step of providing a photocatalyst-containing layer having a wettability of an energy-irradiated part which changes in a direction of reduction of a contact angle with a liquid, at a boundary portion of a picture element part forming portion on which the picture element part is to be formed, on a transparent substrate; and

(2) a step of forming the picture element part on the picture element part forming portion on the transparent substrate.

23. The process for producing a color filter according to claim 22, wherein the wettability on the transparent substrate is less than 10 degrees as a contact angle with a liquid having the surface tension of 40 mN/m.

24. The process for producing a color filter according to claim 18, wherein the contact angle on the

photocatalyst-containing layer with a liquid having a surface tension of 40 mN/m is 10 degrees or more at a part not irradiated with the energy and less than 10 degrees at a part irradiated with the energy.

25. The process for producing a color filter according to claim 22, wherein the contact angle on the photocatalyst-containing layer with a liquid having a surface tension of 40 mN/m is 10 degrees or more at a part not irradiated with the energy and less than 10 degrees at a part irradiated with the energy.

26. The process for producing a color filter according to claim 18, wherein a coloring of the exposed part for a picture element part with the ink jet system is the coloring with the ink jet system using a UV-curing ink.

~~27. The process for producing a color filter according to claim 22, wherein a coloring of the exposed part for a picture element part with the ink jet system is the coloring with the ink jet system using a UV-curing ink.~~

28. A liquid crystal panel comprising a color filter according to claim 1 and a substrate which are opposite to the color filter, and provided a shading part, wherein a liquid crystal compound is encapsulated between both substrates.